Feb. 25, 1958 P. DELLA PORTA 2,824,640

GETTER CONTAINERS AND A METHOD OF MANUFACTURING SUCH CONTAINERS

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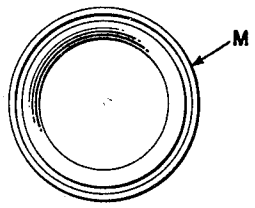


FIG. 1.

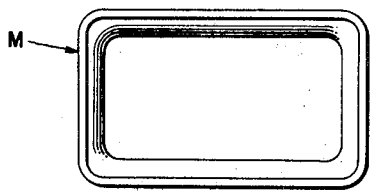
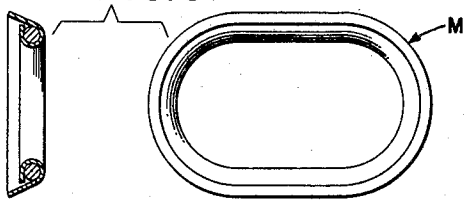


FIG. 2.

FIG. 3.



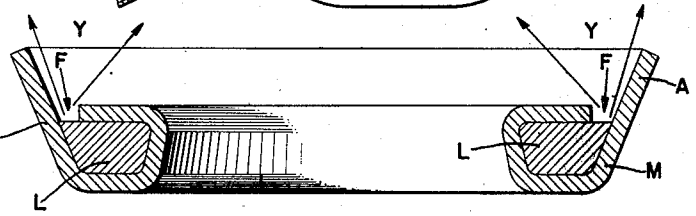


FIG. 4.

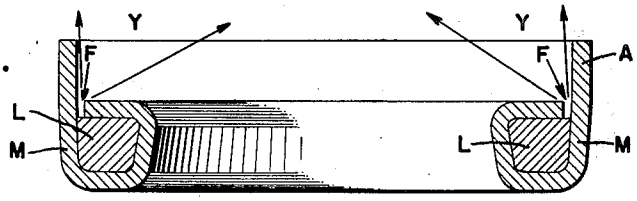


FIG. 5.

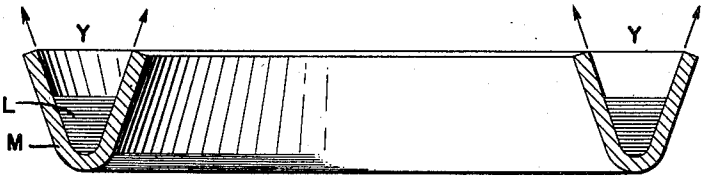


FIG. 6.

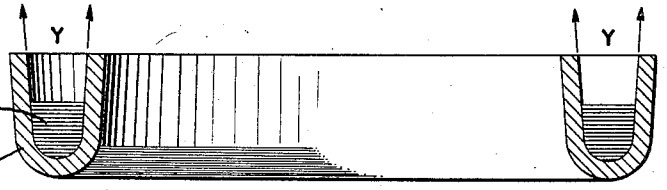


FIG. 7.

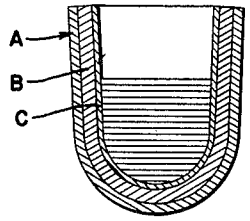


FIG. 8.

INVENTOR
PAOLO DELLA PORTA

BY Stevens, Davis, Miller & Mosher

ATTORNEYS

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GETTER CONTAINERS AND A METHOD OF MANUFACTURING SUCH CONTAINERS

Paolo Della Porta, Milan, Italy

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3 Claims. (Cl. 206—.4)

It is well known in the manufacture of valves and electronic tubes to improve the vacuum in said valves or tubes by introducing an evaporating or gas absorbing substance into the valve or tube. The substance generally used is an alkaline metal, such as barium, calcium or magnesium, having a high fixing power for the gases which remain in the valve or tube after they are evacuated. Due to the fact that such metals, and especially the first two, alter in the air, it is customary to render them stable by alloying them with other metals. Such stabilized alloys, which are provided to act as chemical refiners for the vacuum of valves and vacuum of gas filled electronic tubes, are usually introduced into these devices by means of metallic containers, which are then heated by inductive currents of high frequency through coils arranged on the external part of the valve or electronic tube, so that the active metal which is known as "getter" evaporates.

This invention relates to an improved container for said getter, and according to the invention the container comprises a split tube or channel section member of toroidal, ring or similar closed geometric shape, said split tube or channel section member having a longitudinal slit for the escape of the active metal vapours of the "getter."

In the course of experiments it has been discovered that it is possible to retain the getter material within a V or U section container by pressing said material on the bottom of said container to cause the material to adhere to the container itself. This renders it impossible for the getter in cold state to come out of the container.

It has also been discovered that the container may be furthermore improved by making it from a particular composition of raw materials. Some metals are not suitable for containing getter material, either by reason of the fact that the container must be made of a metal having a melting point which is higher than the temperature of evaporation of the getter, or by reason of the fact that many metals are strongly corroded and also alloyed by the getter material in melted state. Furthermore, in the kind of container in question, an essential characteristic is that the metal constituting the container must be capable of being easily heated by inductive high frequency currents. There are metals that possess one or more of these characteristics, but none possess all of them. It has been found however that improved containers in the form according to this invention may be manufactured by constructing them with two layers of different metals, suitably bonded together, for instance by plating, by any other known method.

In order that the invention may be more clearly understood reference will now be made to the accompanying drawings in which:

Figures 1, 2 and 3 show three embodiments of containers in accordance with the invention,

Figures 4 and 5 show cross sections of two constructions of containers according to the invention,

Figures 6 and 7 illustrate open containers of V and U section respectively, and

Figure 8 is a cross section of an example of a container made with more than one layer of different metals.

One embodiment of the invention consists of a small metallic tube in the form of a continuous ring and filled with an alloy getter material. By continuous ring is to be understood any continuous or closed shape, such as circular (Figure 1) oval (Figure 3) rectangular (Figure 2) or any other suitable closed shape. A particular characteristic of the invention consists in the cross sectional shape of the continuous ring shaped container. Two examples of suitable cross-section shape for the tubular container according to this invention are shown in Figures 4 and 5. Along one face of the tubular container M in both of these forms is located a slit F, through which the active vapour of the getter material passes when the tubular container is heated. A further feature of the invention consists in providing a small wing A on one side of the slit F in such a way that the vapour issuing from the container is directed in accordance with a predetermined angle defined by arrows Y.

The angle defined by arrows Y is determined by the inclination of said small wing A, and in this manner it is possible to project onto the glass of the valve or of the electronic tube a mirror of metal of the desired shape, amplitude and locality.

Another advantage of the container according to the invention lies in the fact that the high frequency currents for heating the container are totally enclosed within the tubular container itself, thus avoiding any need of undesirable and often harmful supports. A further advantage consists in the extreme lightness and very small thermic mass of the container. The latter does not include weldings liable to create fractures in the small tube and losses of evaporated metal. Indeed a thin supporting wire, that bears the ring shaped container within the valve may be simply clasped or hooked around the small tube of the container, instead of a heavy support member being welded to it.

The containers M shown in Figures 6 and 7, are of V and U shaped cross-section respectively. The getter material is put onto the bottom of the container where it is pressed, in order that it firmly adheres to it. The direction of discharge of the getter vapours is indicated by the arrows Y. It is to be understood that if necessary or desirable the wall of the container can be formed differently to vary the angle of discharge of the getter vapours. For example the walls of the container may be arranged at different angles from those shown, and/or one of the walls of the container may be extended beyond the other wall. Figure 8 illustrates a particular construction of container, according to the invention, said container being composed of three layers, viz: a central layer B made for instance of pure iron or of a special steel which is not corrodable by the getter material, the purpose of this layer being to prevent the breaking down of the container, when heated for melting the getter material; an external layer A, for instance made of nickel or aluminum, or any other suitable metal being a good conductor of the inductive high frequency current, the purpose of which is to facilitate the heating of the container, and an internal layer C, which may suitably consist of characteristics of which are similar to those of the metal of the external layer A, which is a good conductor of high frequency current or by a metal which reacts with the getter alloy advantageously, to influence the evaporation.

The internal layer C may be omitted, in so far as a container formed with only the other layers A and B produces a better result than is obtained with a container made of only one material. When the internal layer B is omitted the internal and external layers A

and C may be bonded together in any known manner, for instance by plating. In another arrangement the two layers A and C or the three layers A, B and C may be united by merely folding the upper edges of the inner and outer layers over each other.

The invention also includes a method of manufacturing the above described improved container, said method consisting of the steps of cutting a frame (of, for example, closed, circular, oval, square or rectangular shape) from thin metal sheet; pressing said metal frame in a mould to form it into the desired channel-section shape (for example into V or U cross section) filling the channel section frame with getter material alloy; pressing the getter material into the bottom channel of the frame and finally closing the channel sufficiently to prevent the getter material from coming out of the channel but to leave a narrow slit for the escape of the getter vapours.

It will be understood that the container according to the invention may vary in size and shape without departing from the scope of the invention as defined by the appended claims.

What I claim is:

1. The method of manufacturing a getter assembly comprising the steps of cutting a substantially annular shaped open frame from thin metal sheet material; pressing the frame upon itself to form a channel shaped tube having opposing side walls of substantially equal height; filling the tube with getter material alloy; pressing the getter material firmly into the base portion of the tube, bending the portion of one side wall of the tube above the material over onto the material and toward the other side wall into substantially right angular relationship with the other side wall and in slightly spaced relationship therewith to close the tube sufficiently to prevent the getter material from coming out of the tube and so as to leave a narrow slit for the escape of the getter vapors and bending the portion of the other side wall above

the material into any desired angular relationship to the slit to form a directing wing for directing the vapors of the getter material.

2. A container for getter material comprising a channel shaped tube having opposing side walls and a bottom wall connecting the side walls within which a body of getter material is packed, one of said side walls having an upper portion bent laterally over onto the material and disposed substantially normal to the other side wall and spaced therefrom to define therewith a slit for the escape of getter vapors and the other side wall having an upper portion extending upwardly above the slit and disposed angularly thereto to form a wing for directing the vapors issuing from the slit.

3. A getter assembly comprising a channel shaped tube including a bottom wall and opposing side walls, a body of getter material packed in the tube between the side walls, one of said walls having an upper portion disposed above the getter material and bent over it into substantially right angular relationship with the other side wall and spaced slightly from the other side wall to form a slit for the escape of getter vapors, the other side wall having an upper portion extending above the getter material and above the slit and disposed in angular relationship with the slit to form a wing for directing the getter vapors from the tube.

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